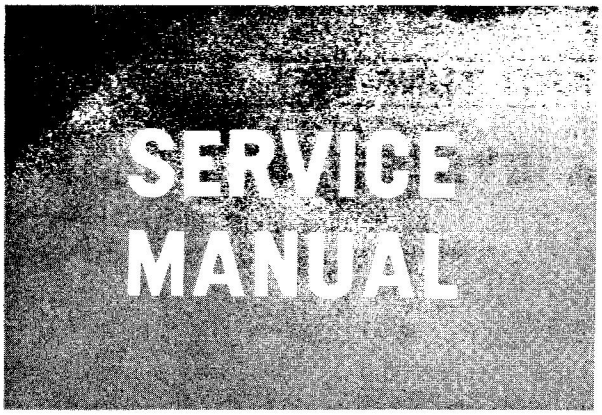


DATSUN PICK-UP
MODEL 620 SERIES
CHASSIS & BODY

NISSAN

NISSAN MOTOR CO., LTD.
TOKYO, JAPAN

SECTION ET

ET

ENGINE TUNE-UP

BASIC MECHANICAL SYSTEM

CONTENTS

ADJUSTING INTAKE AND EXHAUST VALVE CLEARANCE

Valve clearance adjustment is impossible when the engine is in operation:

1. Loosen pivot locking nut and turn pivot screw until the specified clearance is obtained while cold.

Using service tool, tighten pivot locking nut securely after adjustment, and recheck the clearance.

2. Warm up engine for at least several minutes and stop it. Measure valve clearance while hot. If out of specifications, adjust as necessary.

Valve clearance

Unit: mm (in)

Cold	Intake	0.20 (0.008)
	Exhaust	0.25 (0.010)
Warm	Intake	0.25 (0.010)
	Exhaust	0.30 (0.012)

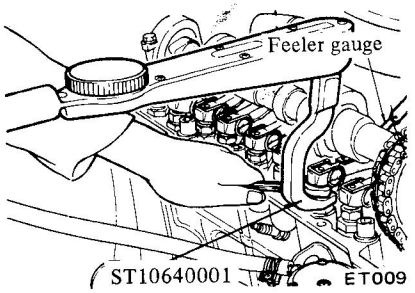


Fig. ET-1 Adjusting valve clearance

CHECKING AND ADJUSTING DRIVE BELT

1. Check for cracks or damage. Replace if necessary.
2. Adjust belt tension. It is correct if deflection is 8 to 12 mm (0.315 to 0.472 in) when thumb pressure [10 kg (22.0 lb)] is applied midway between fan and alternator pulleys.

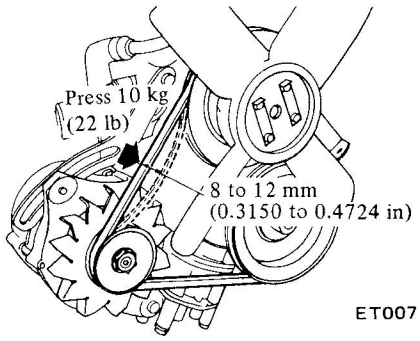


Fig. ET-2 Drive belt tension

RETIGHTENING CYLINDER HEAD BOLTS, MANIFOLD NUTS AND CARBURETOR SECURING NUTS

Tightening torque:
Cylinder head bolts
1st turn
4.0 kg-m (28.9 ft-lb)
2nd turn
6.0 kg-m (43.4 ft-lb)
3rd turn
6.5 to 8.5 kg-m
(47.0 to 61.5 ft-lb)
Manifold nuts
1.2 to 1.6 kg-m
(8.7 to 11.6 ft-lb)
Carburetor nuts
0.5 to 1.0 kg-m
(3.6 to 7.2 ft-lb)

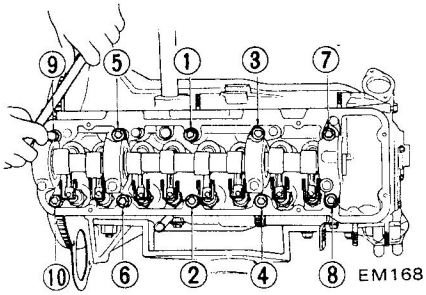


Fig. ET-3 Tightening sequence

CHECKING ENGINE OIL

1. Check if oil is diluted with water or gasoline. Drain and refill oil if necessary.

Notes:

a. **A milky oil indicates the presence of cooling water. Isolate the cause and take corrective measure.**
b. **An oil with extremely low viscosity indicates dilution with gasoline.**

2. Check oil level. If below the specified level, raise it up to the H level.

Engine oil capacity
(including oil filter)
Maximum (H level)
4.3 ℓ (4 ½ U.S. qts., 3 ¾ Imper. qts.)
Minimum (L level)
3.3 ℓ (3 ½ U.S. qts., 2 ⅞ Imper. qts.)

REPLACING OIL FILTER

The oil filter is of a cartridge type. The oil filter can be removed using Oil Filter Wrench ST19320000.

1. Check for oil leaks past gasketed flange. If any leakage is found, retighten just enough to stop leakage. If retightening is no longer effective, replace filter as an assembly.
2. When installing oil filter, tighten by hand.

Note: Do not overtighten oil filter, lest leakage should occur.

CHANGING ENGINE COOLANT (L.L.C.)

Nissan long life coolant

L.L.C. is an ethylene glycol base procuct containing chemical inhibitors to protect the cooling system from rusting and corrosion. The L.L.C. does not contain any glycerine, ethyl or alcohol. It will not evaporate or boil away and can be used with either high or low temperature thermostats. It flows freely, transfers heat efficiently, and will not clog the passages in the cooling system. The L.L.C. must not be mixed with other product. This coolant can be used throughout the seasons of the year.

Whenever any coolant is changed, the cooling system must be flushed and refilled with a new coolant. Check the level.

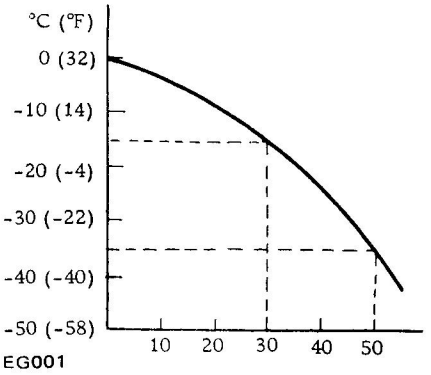


Fig. ET-4 Protection concentration

Percent concentration	Boiling point		Freeze protection
	Sea level	0.9 kg/cm^2 cooling system pressure	
30%	106°C (221°F)	124°C (255°F)	–15°C (5°F)
50%	109°C (228°F)	127°C (261°F)	–35°C (–31°F)

CHECKING COOLING SYSTEM HOSES AND CONNECTIONS

Check hoses and fittings for loose connections and deterioration. Retighten or replace if necessary.

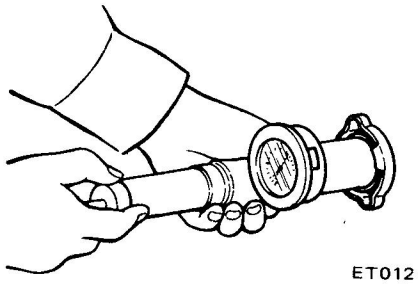


Fig. ET-5 Testing radiator cap

Inspection of radiator cap

Apply reference pressure [0.9 kg/cm^2 (12.8 psi)] to radiator cap by means of a cap tester to see if it is satisfactory. Replace cap assembly if necessary.

Cooling system pressure test

With radiator cap removed, apply reference pressure [1.6 kg/cm^2 (23 psi)] to the cooling system by means of a tester to defect any leakage.

Water capacity

	610	620	510
Without heater	6.0 ℓ (1 ⅝ U.S. gal., 1 ⅜ Imper. gal.)	5.4 ℓ (1 ⅜ U.S. gal., 1 ¼ Imper. gal.)	6.4 ℓ (1 ¾ U.S. gal., 1 ⅜ Imper. gal.)
With heater	6.5 ℓ (1 ¾ U.S. gal., 1 ⅜ Imper. gal.)	6.0 ℓ (1 ⅝ U.S. gal., 1 ⅜ Imper. gal.)	6.8 ℓ (1 ⅞ U.S. gal., 1 ½ Imper. gal.)

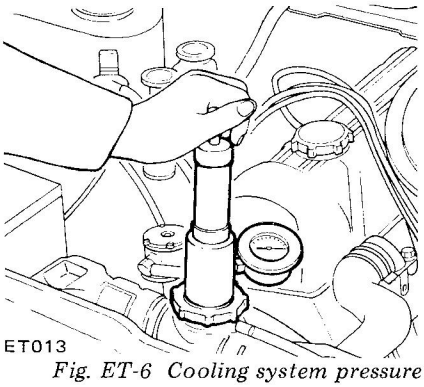


Fig. ET-6 Cooling system pressure test

CHECKING VACUUM FITTINGS, HOSES AND CONNECTIONS

Check fittings and hoses for loose connections or any other defects fittings and hoses for loose connections. Retighten as necessary; replace any defective parts.

CHECKING ENGINE COMPRESSION

When it becomes necessary to check cylinder compression, it is essential to remove all spark plugs. The purpose of this test is to determine whether there is excessive leakage past the piston rings, head gasket, etc. To test, the engine should be heated to the operating temperature and throttle and choke valves opened.

Cylinder compression in cylinders should not be less than 80% of the highest reading. Different compression in two or more cylinder usually indicates an improperly seated valve or broken piston ring.

Low compression in cylinders can result from worn piston rings. This trouble may usually be accompained by excessive fuel consumption.

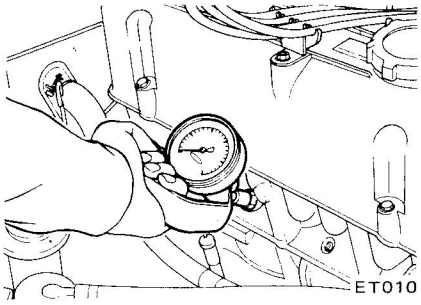


Fig. ET-7 Testing compression pressure

Test result

If cylinder compression in one or more cylinders is low, pour a small quantity of engine oil into cylinders through the spark plug holes and retest compression.

1. If adding oil helps the compression pressure, the chances are that rings are defective.
2. If pressure stays low, the likelihood is that valve is sticking or seating improperly.
3. If cylinder compression in any two adjacent cylinders is low, and if adding oil does not help the compression, this could be leakage past the gasketed surface.

Oil and water in combustion chambers can result from this trouble.

Compression pressure	kg/cm^2 (psi)/at rpm
Standard	12.0 (171)/350
Minimum	9.0 (128)/350

IGNITION AND FUEL SYSTEM

CONTENTS

CHECKING BATTERY

Check electrolyte level in each battery cell.

1. Unscrew each filler cap and inspect fluid level. If the fluid is low, add distilled water to bring the level up approximately 10 to 20 mm (0.394 to 0.787 in) above the plates. Do not overfill.
2. Measure the specific gravity of battery electrolyte.

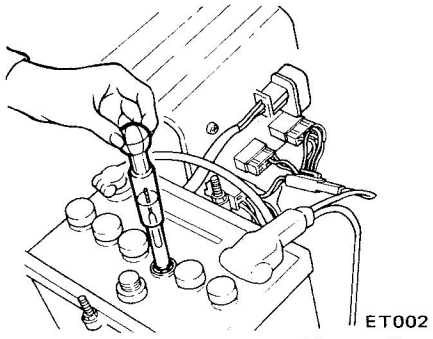


Fig. ET-8 Checking specific gravity of battery electrolyte

	Permissible value	Full charge value (at 20°C (68°F))
Frigid climates	Over 1.22	1.28
Tropical climates	Over 1.18	1.23
Other climates	Over 1.20	1.26

Clean top of battery and terminals with a solution of baking soda and water. Rinse off and dry with compressed air. Top of battery must be clean to prevent current leakage between terminals and from positive terminal to hold-down clamp.

In addition to current leakage, prolonged accumulation of acid and dirt on top of battery may cause blistering of the material covering connector straps and corrosion of straps. After tightening terminals, coat them with petrolatum (vaseline) to protect them from corrosion.

CHECKING AND ADJUSTING IGNITION TIMING

Adjusting ignition timing

1. Check spark plugs and distributor breaker points for condition.
2. Thoroughly wipe off dirt and dust from timing mark on crank pulley and timing indicator on and front cover.
3. Warm up engine sufficiently.
4. Install a timing light on No. 1 cylinder spark plug wire, and install a tachometer.
5. Set idling speed to approximately 800 rpm.
6. Check ignition timing if it is 5° B.T.D.C. (Before Top of Dead Center) by the use of timing light.

If necessary, adjust it as follows;

1. Loosen set screw to such an extent that distributor can be moved by hand.
2. Adjust ignition timing to 5° B.T.D.C.
3. Lock distributor set screw, and make sure that timing is correct.

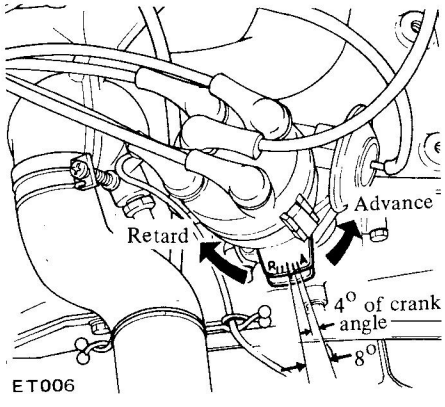


Fig. ET-9 Adjusting ignition timing

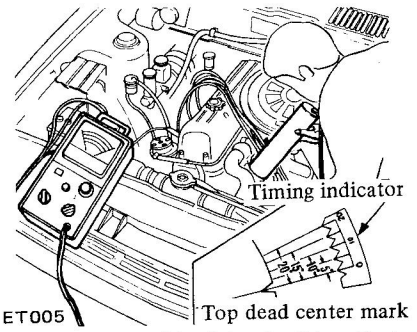


Fig. ET-10 Checking ignition timing

Ignition timing:
5° (Retard side)
12° (Advance side)

CHECKING OR REPLACING DISTRIBUTOR BREAKER POINTS, CONDENSER AND SPARK PLUGS

Distributor breaker points

Check the distributor breaker points for abnormal pitting and wear. Replace if necessary. Make sure they are in correct alignment for full contact and that point dwell and gap are correct. Clean and apply distributor grease to the cam and wick.

Note: Do not apply grease excessibly.

Point gap
0.45 to 0.55 mm
(0.0177 to 0.0217 in)
Dwell angle
49 to 55 degrees

Refer to ET-14, dual point distributor.

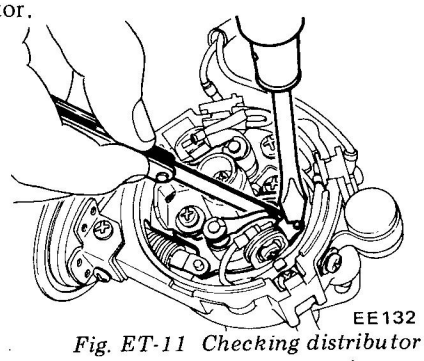


Fig. ET-11 Checking distributor point gap

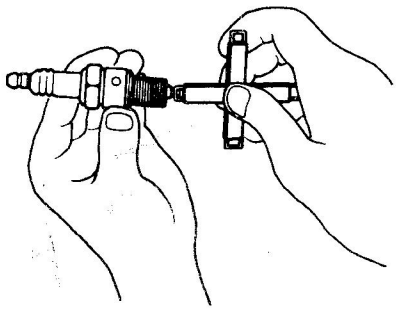
Condenser

1. Clean outlet of condenser lead wire, and check for loose set screw. Retighten if necessary.
2. Check condenser capacity with a capacity meter. Condenser insulation resistance may be also checked using a tester by adjusting its range to measure large resistance value. When condenser is normal, the tester pointer swings largely and rapidly, and moves gradually back to the infinite side. When the pointer does not stay still or it points zero in resistance, replacement is necessary.

Condenser capacity
Retard side 0.05 μ F
(Micro Farad)
Advance side 0.22 μ F
(Micro Farad)
Condenser insulation resistance
5MΩ (Mega ohms)

Spark plugs

Remove and clean plugs in a sand blast cleaner. Inspect each spark plug. Make sure that they are of the specified heat range. Inspect insulator for cracks and chips. Check both center and ground electrodes. If they are excessively worn, replace with new spark plugs. File center electrode flat. Set the gap to 0.7 to 0.8 mm (0.028 to 0.031 in) using the proper adjusting tool. Tighten plugs to 1.5 to 2.0 kg-m (11.0 to 15.0 ft-lb) torque.



EE080

Fig. ET-12 Checking spark plug point gap

CHECKING DISTRIBUTOR, IGNITION WIRING AND IGNITION COIL

Distributor

Check the centrifugal mechanical parts for loose connection, sticking of spring, or excessive or local wear.

If found to be in good condition, then check advance characteristics using a distributor tester. For test procedure and reference data, refer to item "Distributor" in Section EE.

If vacuum advance unit fails to operate properly, check the following items and correct as necessary:

1. Check vacuum inlet for signs of leakage at connection. If necessary, retighten or replace with a new one.
2. Check vacuum diaphragm for air leak.

If leak is found, replace diaphragm with a new one.

3. Inspect breaker plate for smooth operation.

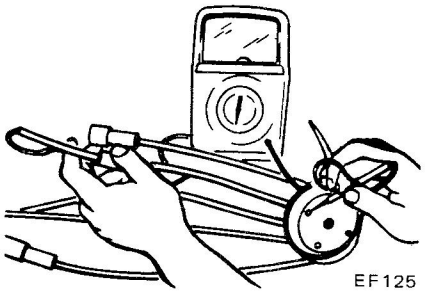
If plate does not move smoothly, this could be due to sticky steel balls or pivot. Apply grease to steel balls or, if necessary, replace breaker plate as an assembly. Refer to section EE-28. Distributor as to vacuum advance charactristics.

Ignition wiring

Use an ohmmeter to check resistance of secondary cables. Disconnect cables from spark plugs and install the proper adaptor between cable and spark plug. Remove distributor cap from distributor with secondary cables attached. Do not remove cables from cap.

Check resistance of one cable at a time.

Connect ohmmeter between spark plug adaptor and corresponding electrode inside cap. If resistance is more than 30,000 ohms remove cable from cap and check cable resistance only. If resistance is still more than 30,000 ohms, replace cable assembly.



EF125

Fig. ET-13 Checking high tension cable

Ignition coil

Check ignition coil for appearance, oil leak or sparking performance. Refer to Section EE-34, ignition coil.

CHECKING DISTRIBUTOR CAP AND ROTOR

Note: This operation is to be performed while checking distributor points. Inspect distributor cap for cracks and flash over.

External surfaces of all parts of secondary system must be cleaned to reduce possibility of voltage loss. All wires should be removed from distributor cap and coil so that terminals can be inspected and cleaned. Burned or corroded terminals indicate that wires are not fully seated, which causes arcing between end of wire and terminal. When replacing wires in terminal, be sure they are fully seated before pushing rubber nipple down over tower. Check distributor rotor for damage, and distributor cap for carcks.

ADJUSTING CARBURETOR IDLE-RPM AND MIXTURE RATIO

Idle mixture adjustment requires the use of a "CO" meter. When preparing to adjust idle mixture, it is

essential to have the meter thoroughly warmed and calibrated.

1. Warm up engine sufficiently.
2. Continue engine operation for one minute at idling speed.
3. Adjust throttle adjusting screw so that engine speed is 800 rpm (in "N" range for automatic transmission).
4. Check ignition timing, if necessary adjust it to the specifications. (5^{o}/800 rpm, retard side)
5. Adjust idle adjusting screw so that "CO" percentage is 1.5 ± 0.5%.
6. Repeat the procedures as described in items 3 and 5 above so that "CO" percentage is 1.5 ± 0.5% at 800 rpm.

Caution:

a. On automatic transmission equipped model, check should be done in the "D" range.
Be sure to apply parking brake and to lock both front and rear wheels with wheel chocks.
b. Hold brake pedal while stepping down on accelerator pedal. Otherwise car will rush out dangerously.

7. On automatic transmission equipped model, make sure that the adjustment has been made with the selector lever in "N" position.

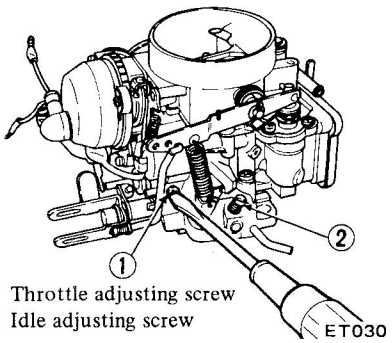
And then check the specifications with the lever in "D" position. Insure that "CO" percent and idle speed are as follows.

Idling rpm	650
"CO" percentage	1.5 ± 0.5%

Readjust by turning in or out throttle adjusting screw or idle adjusting screw if still out.

Notes:

a. Do not attempt to screw down idle adjusting screw completely to avoid damage to tip, which will tend to cause malfunctions.
b. After idle adjustment has been made, shift the lever to "N" or "P" range for automatic transmission.
c. Remove wheel chocks when running.



1 Throttle adjusting screw
2 Idle adjusting screw

Fig. ET-14 Throttle and idle adjusting screws

Idle limiter cap

Do not remove this idle limiter cap unless necessary. If this unit is removed, it is necessary to re-adjust it at the time of installation. To adjust proceed as follows.

1. After adjusting throttle or idle speed adjusting screws, check to be sure that the amount of "CO" contained in exhaust gases meets the established standard.
2. Install idle limiter cap in position, making sure that the adjusting screw further turn 1/8 rotation in the "CO-RICH" direction.

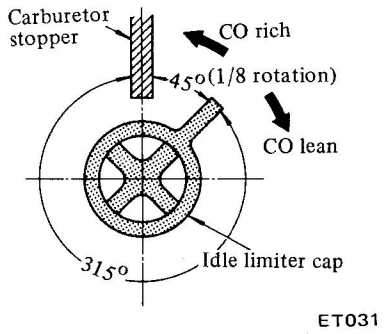


Fig. ET-15 Setting idle limiter cap

CHECKING AND ADJUSTING DASH POT (AUTOMATIC TRANSMISSION ONLY)

Proper contact between throttle lever and dash pot stem provides normal dash pot performance. Adjustment of the proper contact can be made by dash pot set screw.

If normal set can not be obtained between dash pot stem and throttle arm, rotate dash pot to the proper position.

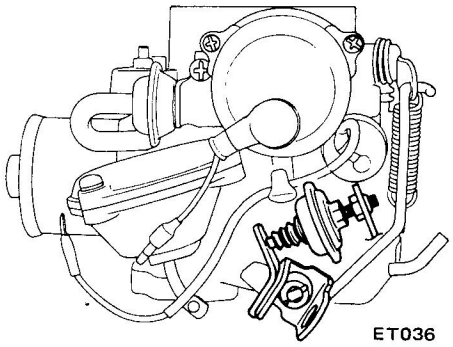


Fig. ET-16 Dash pot adjustment

Installed on engine

1. It is necessary that the idling speed of engine and mixture have been well turned up and engine is sufficiently warm.
2. Turn throttle valve by hand, and read engine speed when dash pot just touches the stopper lever.
3. Adjust the position of dash pot by turning nut until engine speed is in the range of 1,600 to 1,800 rpm.
4. Then fasten loosened lock nut.
5. Make sure that the engine speed is smoothly reduced from 2,000 to 1,000 rpm in about three seconds.

CHECKING CARBURETOR RETURN SPRING

Check throttle return spring for cracks, squareness or deformation, if necessary, replace with a new one.

CHECKING CHOKE MECHANISM (CHOKE VALVE AND LINKAGE)

1. Check choke valve and mechanism for free operation, and clean or

replace if necessary. A binding can result from petroleum gum formation on choke shaft or from damage.

2. Check bimetal cover setting. Index mark on bimetal cover is usually set at center of scale.

Note: When some-what over-choked, turn bi-metal cover clockwise slightly.

3. Every day, before starting engine, depress the accelerator pedal to see if choke valve is closed automatically.

If it fails to be closed, the chances are that link movement is unsmooth, or that bimetal is out of order. Refer to "Carburetor" in section EF (Page EF-15).

CHECKING ANTI-DIESELING SOLENOID

If engine will crank but will not start, check the operation of anti-dieseling solenoid. Check to see if the solenoid issues click sounds with the ignition key turning on. Disconnect and connect the solenoid wiring repeatedly. If the click sound can not be heard and the harness is in good condition, replace the solenoid with a new one.

If engine will not stop when ignition switch is turned off, this indicates a striking (closed) solenoid valve, shutting off supply of fuel to engine. If harness is in good condition, replace solenoid as a unit.

To replace, proceed as follows:

Removal and installation of anti-dieseling solenoid

Removal

Solenoid is cemented at factory. Use special tool "ST19150000" to remove a solenoid.

When this tool is not effective, use a pair of pliers to loosen body out of position.

Installation

(1) Before installing a solenoid, it is essential to clean all threaded parts of carburetor and solenoid. Supply screws in holes and turn them in two or three pitches.

(2) First, without disturbing the above setting, coat all exposed threads with adhesive the "Stud Lock" of LOCTITE or equivalent.

Then, torque screws to 35 to 55 kg-cm (30 to 48 in-lb) using a special tool "ST19150000."

After installing anti-dieseling solenoid, leave carburetor more than 12 hours without operation.

(3) After replacement is over, start engine and check to be sure that fuel is not leaking, and that anti-dieseling solenoid is in good condition.

Notes:

a. **Do not allow adhesive getting on valve. Failure to follow this caution would result in improper valve performance or clogged fuel passage.**
b. **In installing valve, use caution not to hold body directly. Instead, use special tool, tightening nuts as required.**
c. **After installing a new solenoid, check to be certain that there is no leakage, cracks or otherwide deformation.**

REPLACING FUEL FILTER

Check for a contaminated element, and water deposit.

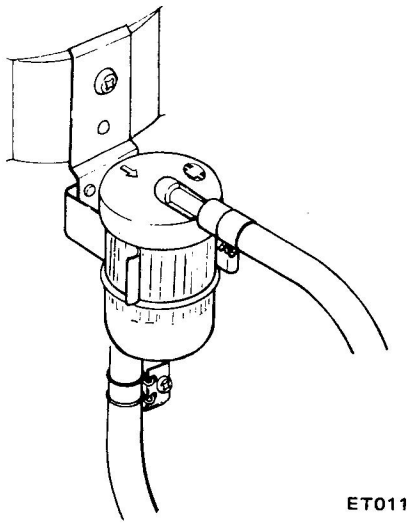


Fig. ET-17 Fuel strainer

All engines use a replaceable cartridge type fuel strainer as an assembly.

CHECKING FUEL LINES (HOSES, PIPINGS, CONNECTIONS, etc.)

Check fuel lines for loose connections, cracks and deterioration. Retighten loose connections and replace any damaged or defective parts.

SPARK TIMING CONTROL SYSTEM

CONTENTS

DESCRIPTION

In this system two spark timings, namely, "Advance" and "Retard," are provided; these can be used independently by electrical means. Between these two timings there is a phase difference of 7 crank-degrees.

The "Retarded" timing is intended for the operating condition as encountered when driving in urban district while the "Advanced" timing is provided to meet the requirement when driving in the suburbs.

Manual transmission

This system consists of a thermo-switch, a throttle switch, a fourth lamp switch, a relay, and a dual-point distributor; and the "Retarded" timing is used to meet the following conditions:

1. The temperature inside the passenger compartment is above 10°C (50°F).
2. The throttle valve is partially opened. (See Table A.)
3. The shift lever is placed in a position other than 4th gear.

Throttle switch is "ON" when throttle switch is below X degree; Table A

	L18 L16 (510)		L16 (620)	
	A/T	M/T	A/T	M/T
Throttle switch opening (X degree)	35 deg	40 deg	45 deg	

The table below shows the operation of each control switch under normal operating condition:

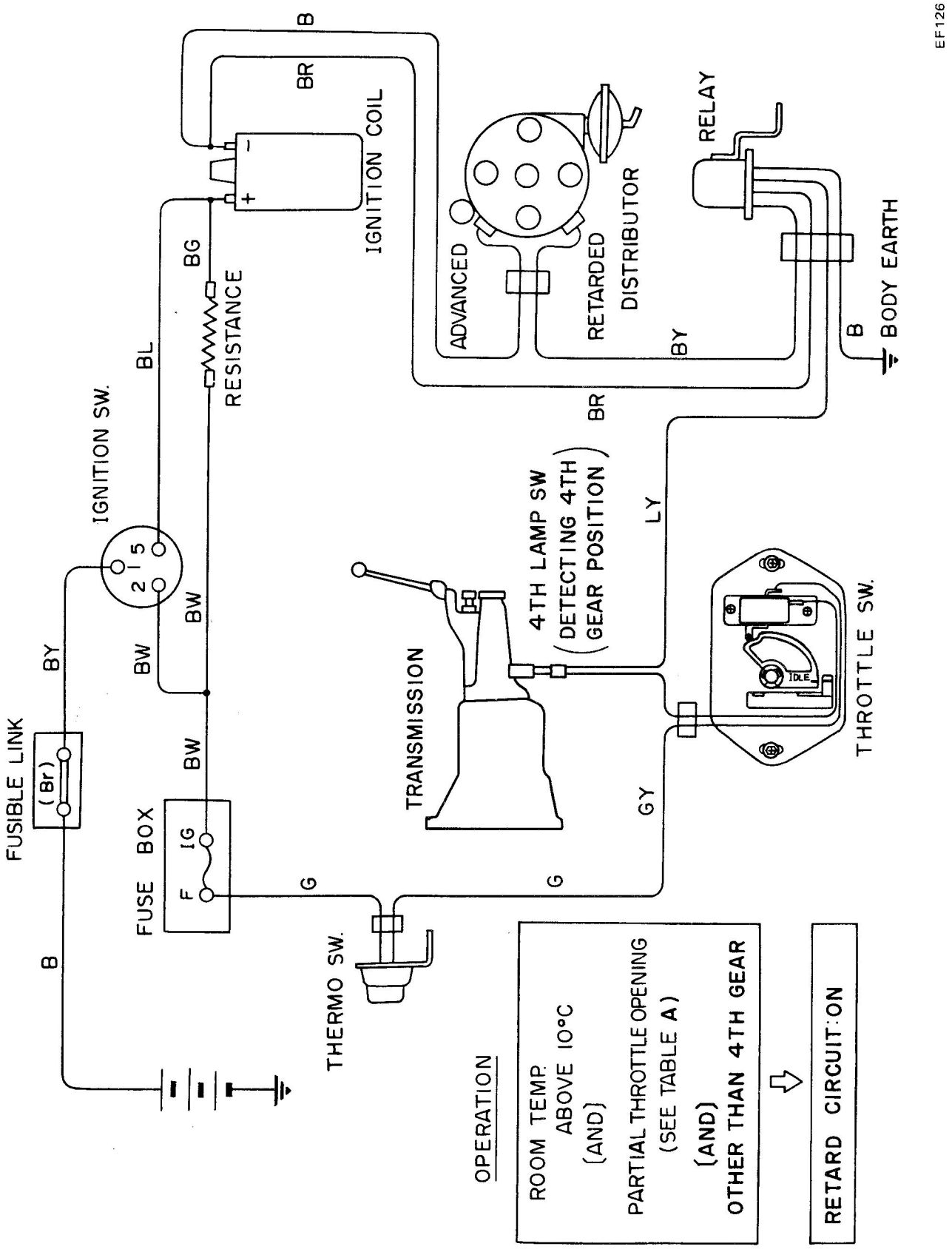


Fig. ET-18 Schematic drawing of spark plug advance control system (Manual Transmission)

Spark timing control system for Manual Transmission

		Throttle SW	Fourth lamp SW	Spark timing	
				"Advance"	"Retard"
Engine start		ON	ON	–	O
Idling		ON	ON	–	O
4-speed gear	Partial O.T.	ON	OFF	O	–
	Wide O.T.	OFF			
Except 4-speed gear	Partial O.T.	ON	ON	–	O
	Wide O.T.	OFF		O	–

Notes:

a. Operation of the thermo-switch has hysteresis of the bimetal. It opens between 5°C (41°F) and 13°C (55°F) when temperature rises from low to high. It closes above 1°C (34°F) when temperature lowers from high to low.

b. When the temperature of passanger compartment is below 1°C (34°F), the system is absolutely "Advance Side" whatever other switch is any condition.

Automatic transmission

This system consists of a thermo-switch, a throttle switch, a relay and a dual-point distributor; and "Retard" timing is used when the following conditions are fulfilled during drive: See Figure ET-19.

1. The temperature inside the passenger compartment is above 10°C (50°F).
2. The throttle valve is partially opened. (See Table A.)

The table below shows the operation of each control switch under normal operation condition:

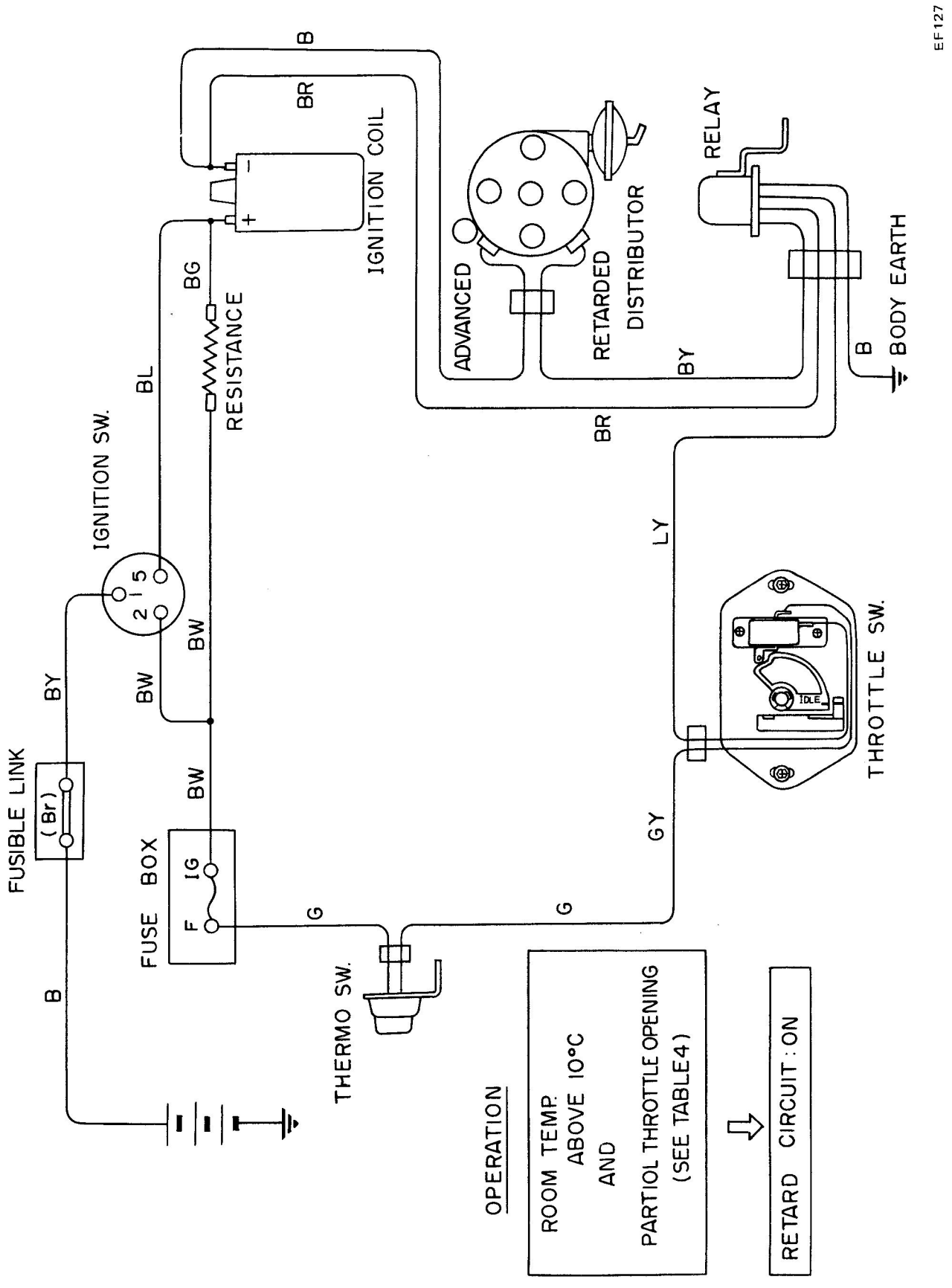


Fig. ET-19 Schematic drawing of spark plug advance control system (Automatic Transmission)

Spark timing control system for Automatic Transmission

	Throttle SW.	Spark timing	
		"Advance"	"Retard"
Engine start	ON	–	O
Idling	ON	–	O
Partial throttle opening	ON	–	O
Wide throttle opening (and high speed crousing)	OFF	O	–

Notes:

a. **Operation of the thermo-switch has hysteresis of the bimetal. It opens between 5°C (41°F) and 13°C (55°F) when temperature rises from low to high. It closes above 1°C (34°F) when temperature lowers from high to low.**

b. **When the temperature of passenger compartment is below 1°C (34°F), the system is absolutely "Advance Side" whatever other switch is any condition.**

FOURTH LAMP SWITCH (MANUAL TRANSMISSION ONLY)

This switch is applicable to the manual transmission only. The switch is operated by the movement of the fork rod in the transmission. The fourth lamp switch shows "OFF" when gear position is in fourth (top).

Testing of fourth lamp switch

1. Make sure of insulation between lead wire terminal of transmission switch and switch body.
2. Disconnect lead wires at the switch, and connect ohmmeter to terminals.
3. Ohmmeter should indicate infinity (∞) when shift lever is in 4th gear position. And it should indicate zero at other gear position including neutral position.
4. If it does not work properly in step 3, replace the switch with a new one.

THERMO-SWITCH

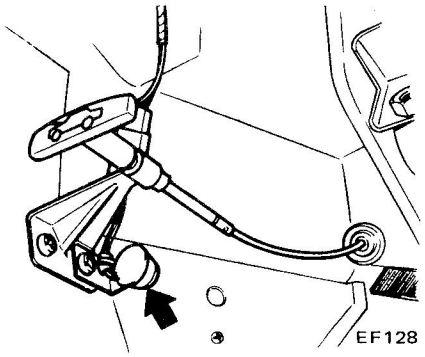


Fig. ET-20 Thermo-switch

Testing of thermo-switch

1. Make sure of insulation between lead wire terminal of thermo-switch and thermo-switch body.
2. Disconnect lead wires at switch and connect ohmmeter to terminals.
3. Ohmmeter should indicate zero when temperature inside the passenger compartment is above 13°C (55°F).
4. If it does not work properly in step 3, replace thermo-switch with a new one.

THROTTLE SWITCH

This switch is set on the bell-crank of the accelerator linkage and operates together with accelerator pedal.

The throttle switch is "ON" when the throttle valve is widely opened.

Testing of throttle switch

1. Detach cover from throttle switch. (610, 510)
2. Make sure that there is a functional sound in switch when accelerator pedal is fully depressed.
3. Make sure of insulation between lead wire terminals and base plate of switch.
4. Inspect whether idle mark of cam and stopper plate is properly aligned.

If it is not aligned, loosen adjusting screws and turn throttle switch itself so that idle mark is properly aligned; then tighten adjusting screws. (610, 510)

5. Inspect whether the clearance between throttle switch and lever is 0.3 mm (0.012 in) when accelerator pedal is fully depressed while micro switch is fully depressed.

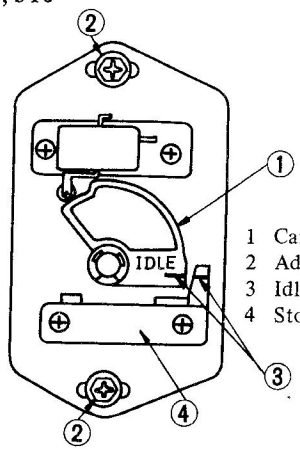
If it is not aligned, loosen adjusting screws and turn throttle switch itself so that the clearance is the specifications. (620)

6. Disconnect coupler and connect ohmmeter to terminals.
7. Ohmmeter should indicate infinity (∞) when pedal is fully depressed.

It should indicate zero when accelerater pedal is released or partially depressed.

8. If switch does not work well step in 6, replace throttle switch assembly.
9. Install cover and connect coupler securely.

610, 510



620

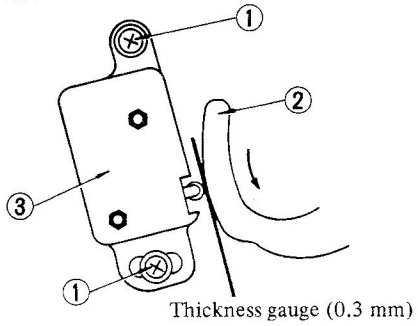


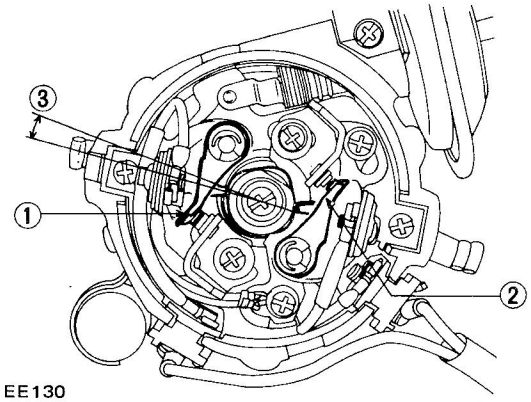
Fig. ET-21 Adjustment of throttle switch

DUAL POINT DISTRIBUTOR

Distributor has two breaker points, located opposite each other with a phase difference as shown in Figure ET-22.

The difference in phase can be adjusted by the adjusting screw. A phase difference of 7 crank angles is adopted.

Those two breaker points are placed parallel in the primary ignition circuit. The retarded breaker point works when the relay is turned "ON" and the advanced breaker point works when the relay is turned "OFF."



1 Advanced breaker point
2 Retarded breaker point
3 Phase difference

Fig. ET-22 Dual point distributor

Checking electric advance control system (Dual point distributor)

Cap and rotor head

Cap and rotor head must be inspected at regular intervals. In addition, remove cap and clean all dust and carbon deposits from cap and rotor from time to time. If cap is cracked or is leaking, replace with a new one.

Point

Standard gaps of both points are 0.45 to 0.55 mm (0.0177 to 0.0217 in). If the gap is off the standard, adjustment must be made by loosening point screws. Gap gauge is required for adjustment.

Both gaps must be checked from time to time.

When point surface is rough, take off any irregularities with fine sand paper of No. 500 or 600 or with oil stone.

At this time, grease must be supplied to cam-shaft and cam heel. (Do not apply excessively.) When wear on each breaker point is noticeable, replace points together with contact arm.

Point gap:
0.45 to 0.55 mm
(0.018 to 0.022 in)
Dwell angle:
49° to 55°

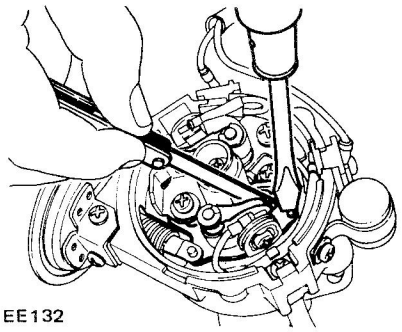


Fig. ET-23 Checking of distributor breaker point gap

If point gap is adjusted by examining dwell angle, install distributor on engine and proceed as follows:

1. Disconnect wiring harness of distributor from engine harness.
2. Using a lead wire, connect B (black) of engine harness and B (black) of distributor harness (advance side).
3. Adjust dwell angle of advance side by loosening point screw.
4. Disconnect lead wire from B (black) of distributor harness and then connect it to Y (yellow) of distributor (Retard side).
5. Adjust dwell angle of retard side by loosening point screw.
6. After adjustment, disconnect lead wire then connect engine harness and distributor harness securely.

Inspection and adjustment of phase difference

To check phase difference, install distributor on engine and proceed as follows:

1. Disconnect wiring harness of distributor from engine harness.
2. Using a lead wire, connect B (black) of engine harness and B (black) of distributor harness. (Advance side). See Figure ET-24.

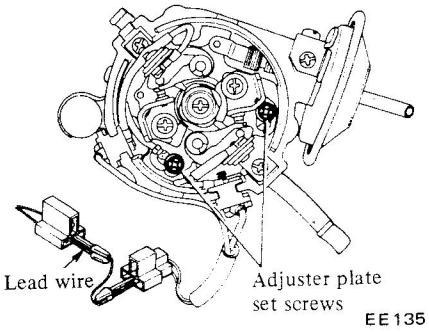


Fig. ET-24 Connect lead wire

3. With engine idling, adjust ignition timing by rotating distributor to specifications. (12°/800 rpm, advance side)
4. Disconnect lead wire from B (black) of distributor harness and then connect it to Y (yellow) of distributor harness. (Retard side)
5. With engine still idling, check to determine that phase delay is 7 degrees in terms of crank shaft angular displacement.

To correct, further proceed as follows:
(1) Referring to Figure ET-25, turn out adjuster plate set screw 1/2 to 2 turns. The screw is located at contact set on retard side.
(2) Using a notch in adjuster place as a hold, turn adjuster plate as required until correct delay is obtained. Ignition is retarded when plate is turned counterclockwise.

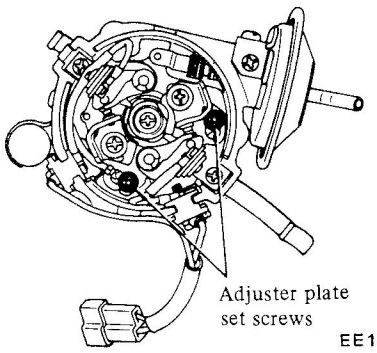


Fig. ET-25 Adjuster plate set screws

Note: Refer to graduations on breaker plate to make adjustment easier. One graduation corresponde to crankshaft angular displacement of 4 degrees.

(3) Tighten adjuster plate set screws to secure the adjustment.
(4) Make sure that the ignition timing of advance side is the specifications.
(5) After adjustment, remove lead wire and connect wiring harness of distributor to engine harness securely.

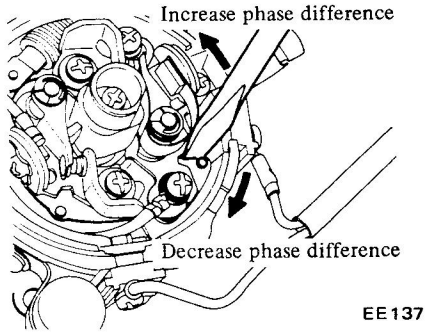


Fig. ET-26

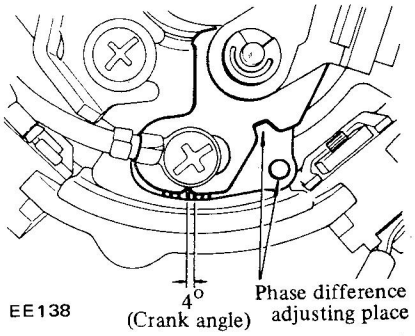


Fig. ET-27 Phase difference adjusting scale

ADJUSTMENT OF OPERATING PRESSURE OF B.C.D.D. (BOOST CONTROLLED DECELERATION DEVICE)

CONTENTS

Primcipally, it is unnecessary to adjust the B.C.D.D., however if there is any requirement the adjustment procedure is as follows.

Prepare the following tools:

1. A tachometer to measure the engine speed while idling, and a screwdriver.
2. A vacuum gauge and connecting pipe.

Notes:

a. A quick-response type boost gauge such as Bourdon's tube type is recommended; mercury-type manometer should not be used.
b. Special tools are not required.

WARMING-UP OPERATION

Warm-up engine until it is heated to operating temperature.

CONNECTING VACUUM GAUGE

Connect rubber hose between vacuum gauge and intake manifold as shown:

Disconnect solenoid valve and let solenoid valve free.

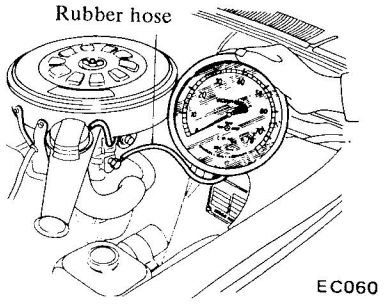


Fig. ET-28 Connecting vacuum gauge

ADJUSTMENT OF IDLING

Adjust the engine at normal idling setting

	Engine idling (rpm)	Idling timing (degree, retard side)	CO (%)
M/T vehicle	800	5° BTDC	1.5 ± 0.5
A/T vehicle	650 (in D range)	5° BTDC	1.5 ± 0.5

RACING

Place shift lever in neutral for M/T, or N or P for A/T. Raise engine speed up to 3,000 to 3,500 rpm under no-load, and close throttle valve by relasing it from hand.

Examine engine rpm whether it falls to idling.

WHEN ENGINE REVOLUTION FALLS TO IDLING

(See Figure ET-33)

At this moment, the negative pressure of manifold rises above –550 mmHg (–21.7 inHg) and then gradually falls down to the pressure of idling [about –420 mmHg (–16.5 inHg)].

The process of this pressure fall takes one of the three forms as illustrated in Figures ET-29, ET-31 and ET-32 according to the difference of the operating pressure of B.C.D.D.

When the operating pressure is too high

1. When the operating pressure is too high, B.C.D.D. remains inoperative, and negative pressure decreases without being sustained while it is falling, just like that of the engine on which a B.C.D.D. is absent. See diagram (A).
2. When the operating pressure is lower than that of the case of (A) but is higher than the set pressure: The negative pressure which has once risen is kept constant at a certain value (operating pressure) for about one second, and then gradually falls to the idling negative pressure. See diagram (B).

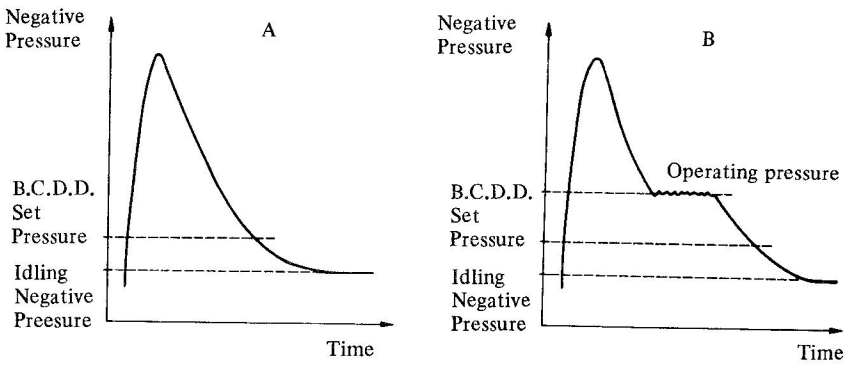
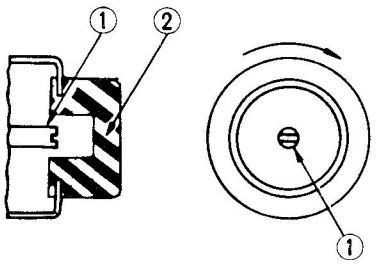


Fig. ET-29 Characteristic curve — high negative pressure —



1 Adjusting screw "S"
2 Cover "C" ET037

Fig. ET-30 Adjusting operating pressure

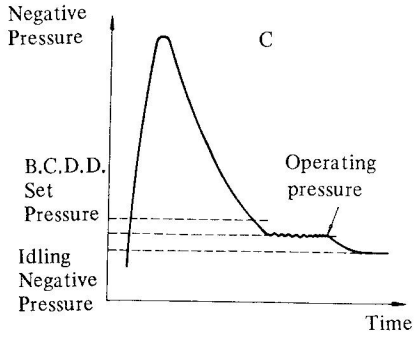
Turn adjusting screw "S" as outlined below until correct pressure is obtained. Slightly turn this adjusting screw clockwise and then race engine. Do not fit tip of screw driver tightly in screw slot.

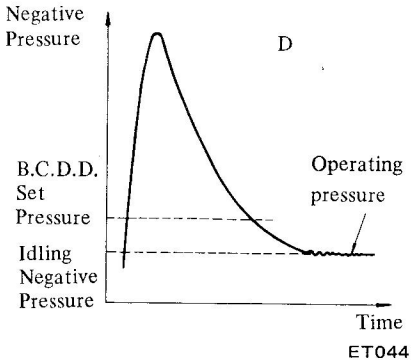
Notes:

a. Turning adjusting screw "S" one-eighth rotation in either direction will cause a change in operating pressure of 20 mmHg (0.79 inHg). This adjusting screw is left-hand threaded.

b. Turn adjusting screw "S" counter-clockwise to increase the negative pressure.

c. Turn adjusting screw clockwise to decrease the negative pressure.





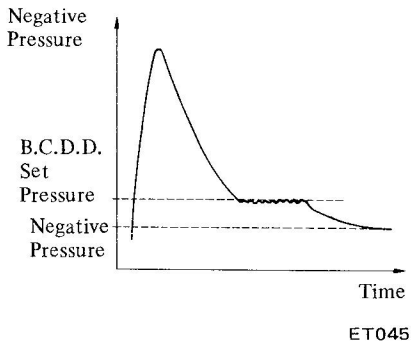
ET044

Fig. ET-31 Characteristic curve — low negative pressure —

When the operating pressure equals set pressure

When the operating pressure is equalized to set pressure, and then falls to idling pressure, install cover "C."

B.C.D.D. set pressure
Manual transmission vehicle
−500 ± 20 mmHg
(−19.7 ± 0.787 inHg)
Automatic transmission vehicle
−480 ± 20 mmHg
(−18.9 ± 0.787 inHg)



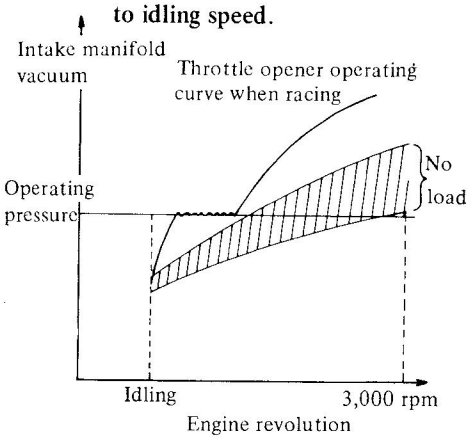
ET045

Fig. ET-32 Characteristic curve — proper negative pressure —

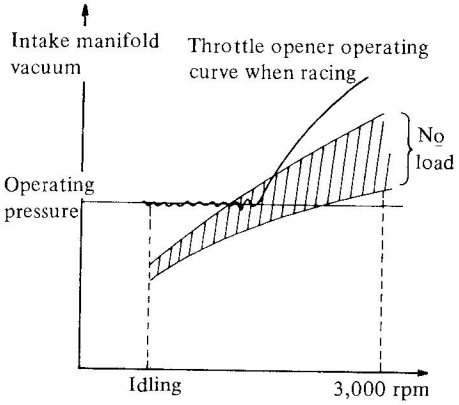
WHEN THE ENGINE REVOLUTION DOES NOT FALL TO THE IDLING SPEED

(See Figure ET-33)

When engine revolution falls to idling speed.



When engine revolution does not fall to idling speed.



ET046

Fig. ET-33 Characteristic curve of B.C.D.D.

When the engine rpm does not fall to idling, it is necessary to reduce the idling negative pressure of manifold to lower than the set pressure of B.C.D.D. (The engine revolution does not fall to the idling speed when the idling negative pressure is higher than the set pressure of B.C.D.D.).

In this case, it is necessary to labour the engine by (1) road test or (2) chassis dynamometer or (3) raise up rear suspension member by stand. And accelerate the car 40 to 50 mph with top gear for M/T or D range for A/T, then release the accelerator pedal and let the car deceleration.

Then check the B.C.D.D. set pressure whether it is in the predetermined valve or not.

The process of this pressure fall takes one of the three forms as illustrated in Figures ET-29, ET-31, and ET-32 according of the difference of the operating pressure of B.C.D.D.

When the operating pressure is too high

When the operating pressure is higher than the set pressure. The negative pressure which has once risen is kept constant at a certain value (operating pressure) for about one second, and then gradually falls to the idling negative pressure. See diagram (B).

Adjustment of this condition is exactly same as that of when the engine revolution falls to the idling speed. (Mentioned above.)

When the operating pressure is too low

1. When the operating pressure is somewhat low, the negative pressure becomes constant for some while at a value below set pressure, and then falls to idling negative pressure. See diagram (C).
2. When the operating pressure is exceedingly low, the negative pressure will not fall to idling pressure and the speed of engine is not restored to the idling speed.

In extreme case, the engine speed fails to attain idling speed although to that of idling. See diagram (D).

Turn adjusting screw "S" until correct pressure is obtained. Slightly turn this adjusting screw counterclockwise and then race the engine. Do not fit tip of screwdriver tightly in screw slot.

AUTOMATIC TEMPERATURE CONTROL AIR CLEANER (A.T.C. AIR CLEANER)

CONTENTS

REPLACING CARBURETOR AIR CLEANER FILTER

The paper element (viscous type) has been specially treated, and therefore, there is no need to clean it. But it should be replaced with a new one periodically.

CHECKING HOT AIR CONTROL VALVE

Inspection

Among the possible troubles of this device, the most liable is the permanent opening of valve.

This trouble is not noticed in warm weather, but in cold weather appears as poor performance of engine, such as tardy acceleration, hesitation or engine stall. When such a claim has been raised by the user, first inspect this device before checking the carburetor.

Another trouble which might be expected is that the underhood-air is kept closed by the valve regardless of the temperture of suction air around the sensor while the engine is running. This trouble appears in the from of extremely excessive fuel consumption or decrease in power.

The inspection of the device should be proceeded as follows:

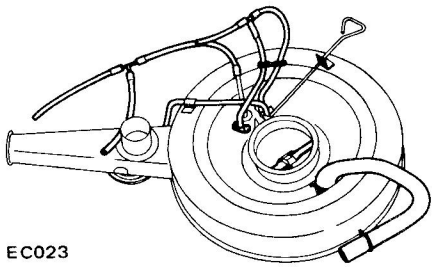


Fig. ET-34 Correct position of hoses

Appearance

1. First inspect whether the vacuum hoses are connected to the correct positions.
2. Inspect the hoses for cracks, distortion, plugging.

Checking of vacuum motor

1. With the engine shut down, inspect the position of valve (placing a mirror at the end of inlet pipe for inspection. The correct condition of valve is that it keeps the inlet of underhood-air open and that of hot air closed. Otherwise, inspect the linkage of valve.

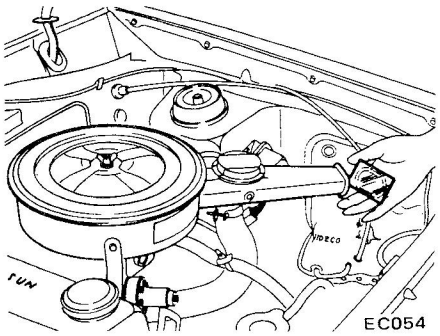


Fig. ET-35 Inspecting valve position

2. Disconnect the hose at the vacuum motor inlet, and directly apply vacuum of manifold to vacuum motor by connecting another hose; sucking by the mouth may be substituted for this process. If underhood-air inlet is closed by the valve, valve is in good condition. Inspect linkage if found otherwise. And then no defect is found even in the linkage, it signifies the trouble of the vacuum motor.

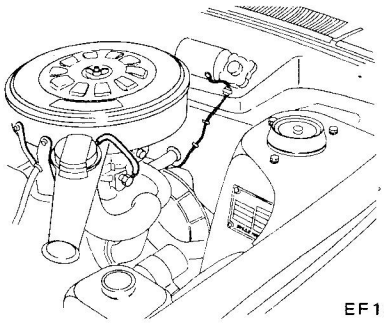


Fig. ET-36 Checking vacuum motor

3. The valve shows correct condition if it keeps underhood-air inlet closed when the passage in the hose is stopped by twisting or clamping it while applying vacuum. If otherwise, it is an indication of leakage taking place in the vacuum motor.
4. When defect is found through this check, replace the air cleaner assembly.

Checking of sensor

1. Perform the engine test by keeping the temperature around the sensor below 30°C (86°F). Make sure that the engine is cooled down before the test is conducted.
2. Before running the engine, make certain that the valve on underhood-air side fully open.
3. Start the engine and operate it at an idling speed. The valve is in good condition if underhood-air side fully closes immediately after starting.
4. Carefully watch the valve to ascertain that it gradually begins open as the engine warms up. But, when the ambient temperature is low, it takes considerable length of time for the valve to begin to open, or in some case it hardly opens. This should not, however, be regarded as trouble.

If the valve does not operate satisfactorily or if the condition of the valve is questionable, further conduct the following test:
5. Remove the air cleaner cover, and put a thermister or a small thermometer as close to the sensor as possible with adhesive tape. Install the air cleaner cover again.

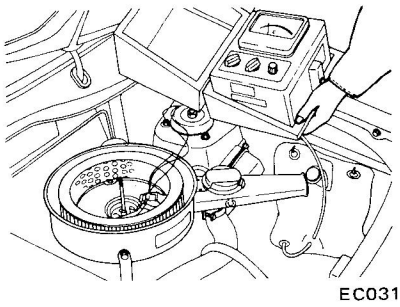


Fig. ET-37 Checking sensor

6. Start the engine and continue idling as described under paragraphs (1), (2), and (3) above. When several minutes have passed and valve is partially opened, read the thermister indication. It is correct if the reading falls between 37.5°C (100°F) and 48°C (118°F). If the reading is abnormal, replace sensor.
7. On the engine equipped with an idle compensator as service option, do as follows before replacing sensor:

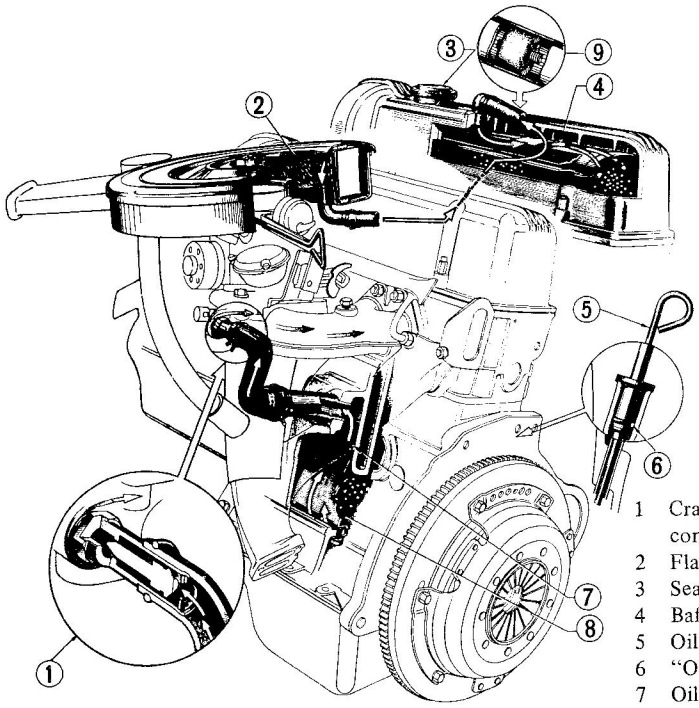
CRANKCASE EMISSION CONTROL SYSTEM

CONTENTS

This system returns blow-by gas to both the intake manifold and carburetor air cleaner.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the valve. Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the clean side of the carburetor air cleaner, through the tube connecting carburetor air cleaner to rocker cover, into the crankcase.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve, and its flow goes through the tube connection in the reverse direction. In cars with an excessively high blow-by some of the flow will go through the tube connection to the carburetor air cleaner under all conditions.



1 Crank case ventilation control valve
2 Flame arrester
3 Sealed filler cap
4 Baffle plate
5 Oil level gauge
6 "O" Ring
7 Oil separator
8 Baffle plate
9 Flame arrester

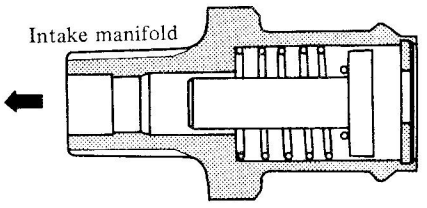
EC031

Fig. ET-38 Crankcase emission control system (closed type)

CHECKING AND REPLACING PCV VALVE

Test PCV valve in accordance with the following method.

With engine running at idle, remove the ventilator hose from PCV valve, if the valve is working, a hissing noise will be heard as air passes through the valve and a strong vacuum should be felt immediately when a finger is placed over valve inlet. If the valve is plugged, replace with a new valve. Check for deposit plugging in the hose. Clean if necessary.



EC014

Fig. ET-39 Cross-sectional view of PCV valve

CHECKING VENTILATION HOSES

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and blow them out with compressed air.

If any hose can not be free of obstructions, replace with a new one.

Insure that the flame arrester is surely inserted in the hose, between air cleaner and locker cover.

EVAPORATIVE EMISSION CONTROL SYSTEM

CONTENTS

CHECKING ENGINE COMPARTMENT HOSE CONNECTIONS AND FUEL VAPOR CONTROL VALVES

Checking fuel tank, vapor-liquid separator and vapor vent line

1. Check all hoses and fuel tank filler cap.
2. Disconnect the vapor vent line connecting flow guide valve to vapor-liquid separator.
3. Connect a 3-way connector, a manometer and a cock (or an equivalent 3-way change cock) to the end of the vent line.
4. Supply fresh air into the vapor vent line through the cock little by little until the pressure becomes 368 mm (14.5 in) Aq.
5. Shut the cock completely and leave it that way.
6. After 2.5 minutes, measure the height of the liquid in the manometer.
7. Variation of height should remain within 25 mm (1.0 in) Aq.
8. When the filler cap does not close completely the height should drop to zero in a short time.
9. If the height does not drop to zero in a short time when the filler cap is removed, it is the cause of the stuffy hose.

Note: In case the vent line is stuffy, the breathing in fuel tank si not thoroughly made, thus causing in sufficient delivery of fuel to engine or vapor lock. It must therefore be repaired or replaced.

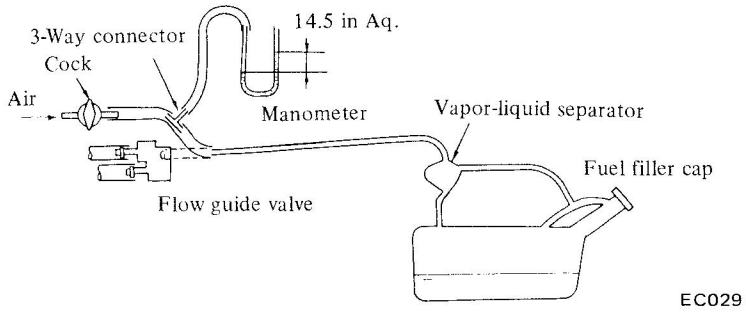


Fig. ET-40 Checking evaporative emission control system

Checking flow guide valve

1. Disconnect all hoses connected to the flow guide valve.
2. While lower pressure air is pressed into the flow guide valve from the ends of vent line of fuel tank side, the air should go through the valve and flow to crankcase side. If the air does not flow the valve should be replaced. But when the air is blown from crankcase side, it should never flow to the other two vent lines.
3. While the air is pressed into the flow guide valve from the carburetor air cleaner side, it flows to the fuel tank side and/or crankcase side.
4. This valve opens when the inner pressure 10 mm Hg (0.4 in Hg). In case of improper operations or breakage, replace it.

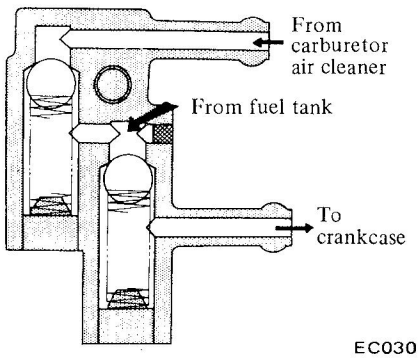


Fig. ET-41 Flow guide valve

CHECKING FUEL TANK VACUUM RELIEF VALVE OPERATION

Remove fuel filler cap and see it functions properly as follows;

1. Wipe clean valve housing and have it in your mouth.
2. Inhale air. A slight resistance accompanied by valve indicates that valve is in good mechanical condition. Note also that, by furhter inhaling air the resistance should be disappeared with valve clicks.
3. If valve seems to be clogged, or if no resistance is felt, replace cap as an assembled unit.

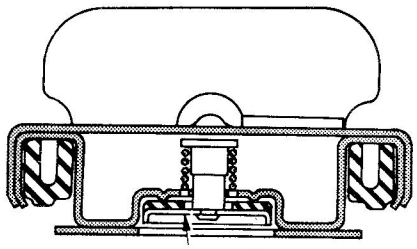


Fig. ET-42 Fuel filler cap

SERVICE DATA AND SPECIFICATIONS

Basic mechanical system

Valve clearance			
Cold	Intake	mm (in)	0.20 (0.008)
	Exhaust	mm (in)	0.25 (0.010)
Warm	Intake	mm (in)	0.25 (0.010)
	Exhaust	mm (in)	0.30 (0.012)
Drive belt tension		mm (in)	8 to 12 (0.315 to 0.472)
When thumb pressure		kg (lb)	10 (22) is applied
Tightening torque			
Cylinder head bolts			
1st turn		kg-m (ft-lb)	4.0 (28.9)
2nd turn		kg-m (ft-lb)	6.0 (43.4)
3rd turn		kg-m (ft-lb)	6.5 to 8.5 (47.0 to 61.5)
Manifold nuts		kg-m (ft-lb)	1.2 to 1.6 (8.7 to 11.6)
Carburetor nuts		kg-m (ft-lb)	0.5 to 1.0 (3.6 to 7.2)
Engine oil capacity			
Maximum (H)		ℓ [U.S. qts., Imper. qts.]	4.3 (4 ½ , 3 ¾)
Minimum (L)		ℓ [U.S. qts., Imper. qts.]	3.3 (3 ½ , 2 ⅞)
Cooling system capacity			
610	Without heater	ℓ [U.S. gal., Imper. gal.]	6.0 (1 ⅝ , 1 ⅜)
	With heater	ℓ [U.S. gal., Imper. gal.]	6.5 (1 ¾ , 1 ⅜)
620	Without heater	ℓ [U.S. gal., Imper. gal.]	5.4 (1 ⅜ , 1 ¼)
	With heater	ℓ [U.S. gal., Imper. gal.]	6.0 (1 ⅝ , 1 ⅜)
510	Without heater	ℓ [U.S. gal., Imper. gal.]	6.4 (1 ¾ , 1 ⅜)
	With heater	ℓ [U.S. gal., Imper. gal.]	6.8 (1 ⅞ , 1 ½)
Radiator cap pressure test		kg/cm^2 (psi)	0.9 (12.8)
Cooling system pressure test		kg/cm^2 (psi)	1.6 (23.0)
Engine compression			
Maximum		kg/cm^2 (psi)/at rpm	12.0 (171)/350
Minimum		kg/cm^2 (psi)/at rpm	9.0 (128)/350

Ignition and fuel system

Ignition timing	degree	5° (B.T.D.C.)
Distributor		
Point gap	mm (in)	0.45 to 0.55 (0.0177 to 0.0217)
Dwell angle	degrees	49 to 55
Condenser capacity	μF	retard side 0.05 advance side 0.22
Condenser insulation resistance	MΩ	5
Idling adjustment		
Manual Transmission	degree/rpm	5°/800 (retard side)
	CO %	1.5 ± 0.5
Automatic Transmission	degree/rpm	5°/650 (retard side, "D" range)
	CO %	1.5 ± 0.5
Dash pot adjustment	rpm	1,600 to 1,800
Anti-dieseling solenoid tightening torque	kg-cm (in-lb)	35 to 55 (30 to 48)
Spark timing control system		
Throttle switch operating angle		
L18 A/T	degree	35°
L16 (510) M/T	degree	40°
L16 (620) A/T & M/T	degree	45°
Thermo-switch operating temperature	°C (°F)	5 to 13 (41 to 55)
Adjustment of operating pressure of B.C.D.D.		
B.C.D.D. set pressure		
A/T	mmHg (inHg)	−480 ± 20 (−18.9 ± 0.787)
M/T	mmHg (inHg)	−500 ± 20 (−19.7 ± 0.787)
A.T.C. Air cleaner		
A.T.C. Valve opening temperature	°C (°F)	37.5 to 48 (100 to 118)

TROUBLE DIAGNOSES AND CORRECTIONS

Condition	Probable cause	Corrective action
CANNOT CRANK ENGINE OR SLOW CRANKING	Improper grade oil.	Replace with proper grade oil.
	Discharged battery.	Charge battery.
	Defective battery.	Replace.
	Loose fan belt.	Adjust.
	Trouble in charge system.	Inspect.
	Wiring connection trouble in starting circuit.	Correct.
	Defective ignition switch.	Repair or replace.
	Defective starter motor.	Repair or replace.

(Trouble-shooting procedure on starting circuit)
Switch on the starting motor with light "ON."

When light goes off or dims considerably.

a. Check battery.
b. Check connection and cable.
c. Check starter motor.

When light stays bright.

a. Check wiring connection between battery and starter motor.
b. Check starter switch.
c. Check starter motor.

ENGINE WILL CRANK NORMALLY BUT WILL NOT START

In this case, the following trouble causes may exist, but in many cases ignition system or fuel system is in trouble.

Ignition system in trouble
Fuel system in trouble
Valve mechanism does not work properly
Low compression

(Trouble-shooting procedure)
Check spark plug firstly by following procedure.
Disconnect high tension cable from one spark plug and hold it about 10 mm (0.3937 in) from the engine metal part and crank the engine.

Good spark occurs.

a. Check spark plug.
b. Check ignition timing.
c. Check fuel system.
d. Check cylinder compression.

No spark occurs.

Very high current. — Inspect primary circuit for short. Check breaker point operation.

Check the current flow in primary circuit.

Condition	Probable cause	Corrective action
	Low or no current.	Check for loose terminal or disconnection in primary circuit. Check for burned points.
Ignition system in trouble	Burned distributor point.	Repair or replace.
	Improper point gap.	Adjust.
	Defective condenser.	Replace.
	Leak at rotor cap and rotor.	Clean or replace.
	Defective spark plug.	Clean, adjust plug gap or replace.
	Improper ignition timing.	Adjust.
	Defective ignition coil.	Replace.
	Disconnection of high tension cable.	Replace.
	Loose connection or disconnection in primary circuit.	Repair or replace.
Fuel system in trouble	Lack of fuel.	Supply.
	Dirty fuel strainer.	Replace.
	Dirty or clogged fuel pipe.	Clean.
	Fuel pump will not work properly.	Repair or replace.
	Carburetor choke will not work properly.	Check and adjust.
	Improper adjustment of float level.	Correct.
	Improper idling.	Adjust.
	Dirty or clogged carburetor.	Disassemble and clean.
	Clogged breather pipe of fuel tank.	Repair and clean.
	Damaged anti-dieseling solenoid.	Replace.
Low compression	Incorrect spark plug tightening or defective gasket.	Tighten to normal torque or replace gasket.
	Improper grade engine oil or low viscosity.	Replace with proper grade oil.
	Incorrect valve clearance.	Adjust.
	Compression leak from valve seat.	Remove cylinder head and lap valves.
	Sticky valve stem.	Correct or replace valve and valve guide.
	Weak or defective valve springs.	Replace valve springs.
	Compression leak at cylinder head gasket.	Replace gasket.
	Sticking or defective piston ring.	Replace piston rings.
	Worn piston ring or cylinder.	Overhaul engine.
(Trouble shooting procedure) Pour the engine oil from plug hole, and then measure cylinder compression.		
	Compression increases.	Trouble in cylinder or piston ring.
	Compression does not change.	Compression leaks from valve, cylinder head or head gasket.

Condition	Probable cause	Corrective action
IMPROPER ENGINE IDLING		
Fuel system in trouble	Clogged or damaged carburetor jets.	Clean or replace.
	Incorrect idle adjustment.	Adjust.
	Clogged air cleaner.	Replace element.
	Defective manifold gaskets or carburetor insulator.	Replace gasket or insulator.
	Improper float level adjustment.	Adjust.
Low compression		Previously mentioned.
Others	Incorrect valve clearance.	Adjust.
	Extremely low revolution.	Adjust.
	Poor acceleration above 1,000 rpm (Twin carb.)	Loosen idling adjusting nuts about a half turn.
	Defect or malfunction of the ignition system (spark plug, high tension cable, breaker point, ignition coil, etc.).	Replace
	Incorrect basic ignition timing.	Adjust
	Incorrect valve clearance.	Adjust
	B.C.D.D. adjustment incorrect.	Adjust.
	Damaged vacuum control solenoid.	Replace.
	Sticked anti-stall dash pot.	Replace.
ENGINE POWER NOT UP TO NORMAL		
Low compression		Previously mentioned.
Ignition system in trouble	Incorrect ignition timing.	Adjust.
	Defective spark plugs.	Clean, adjust or replace plugs.
	Defective distributor points.	Dress, or replace points. Also check condenser.
Fuel system in trouble	Malfunction of choke system.	Adjust.
	Clogged fuel pipe or floating valve.	Clean.
	Dirty or clogged fuel strainer.	Replace.
	Fuel pump will not work properly.	Repair or replace.
	Clogged carburetor jets.	Disassemble and clean.
Air intake system in trouble	Clogged air cleaner.	Replace element.
	Air inhaling from manifold gasket or carburetor gasket.	Replace gasket.

Condition	Probable cause	Corrective action
Overheating	Insufficient coolant.	Replenish.
	Loose fan belt.	Adjust fan belt.
	Worn or defective fan belt.	Replace.
	Defective thermostat.	Replace.
	Defective water pump.	Replace.
	Clogged or leaky radiator.	Flush, repair or replace.
	Defective radiator filler cap.	Replace.
	Air in cooling system.	Retighten each part of cooling system.
	Improper engine oil grade.	Replace with proper grade oil.
	Incorrect ignition timing.	Adjust.
	Defective carburetor (lean mixture).	Overhaul carburetor.
Overcooling	Defective thermostat.	Replace.
Others	Improper octane fuel.	Replace with specified octane fuel.
	Improper tire pressure.	Inflate to specified pressure.
	Dragging brake.	Adjust.
	Clutch slipping.	Adjust.
NOISY ENGINE		
Car knocking	Overloaded engine.	Use right gear in driving.
	Carbon knocking.	Disassemble cylinder head and remove carbon.
	Timing knocking.	Adjust ignition timing.
	Fuel knocking.	Use specified octane fuel.
	Preignition (misusing of spark plug).	Use specified spark plug.
Mechanical knocking		
Crankshaft bearing knocking.	This strong dull noise increases when engine is accelerated. To locate the place, cause a misfire on each cylinder. If the noise stops by the misfire, this cylinder generates the noise.	This is caused by worn or damaged bearings, or unevenly worn crankshaft. Renew bearings and adjust or change crankshaft. Check lubrication system.
Connecting rod bearing knocking.	This is a little higher-pitched noise than the crankshaft knocking, and also increases when engine is accelerated. Cause a misfire on each cylinder and if the noise deminishes almost completely, this crankshaft bearing generates the noise.	Same as the case of crankshaft bearings.
Piston and cylinder noise.	When you hear an overlapping metalic noise which increases its magnitude with the revolution of engine and which decreases as engine is warmed up, this noise is caused by piston and cylinder. To locate the place, cause a misfire on each cylinder.	This may cause an abnormal wearing of cylinder and lower compression which in turn will cause a lower out-put power and excessive consumption of oil. Overhaul engine.

Condition	Probable cause	Corrective action
Piston pin noise.	This noise is heared at each highest and lowest dead end of piston. To locate the place, cause a misfire on each cylinder.	This may cause a wear on piston pin, or piston pin hole. Renew piston and piston pin assembly.
Water pump noise.	This noise may be caused by worn or damaged bearings, or by the uneven surface of sliding parts.	Replace water pump with a new one.
Others.	An improper adjustment of valve clearance.	Adjust.
	Noise of timing chain.	Adjust the tension of chain.
	An excessive end-play on crankshaft.	Disassemble engine and renew main bearing.
	Note: This noise will be heared when clutch is disengaged.	
	Wear on clutch pilot bushing.	Renew bush and adjust drive shaft.
	Note: This noise will be heared when clutch is disengaged.	
ABNORMAL COMBUSTION (back fire, after fire run-on etc.)		
Improper ignition timing	Improper ignition timing.	Adjust ignition timing.
	Improper heat range of spark plugs.	Use specified spark plugs.
Fuel system in trouble	Damaged carburetor or manifold gasket. (back fire, after fire)	Replace them with new parts.
	Defective carburetor jet.	Disassemble carburetor and check it.
	Improper function of the float.	Adjust the level, and check needle valve.
	Uneven idling. (Run on)	Adjust.
Defective cylinder head, etc.	Improperly adjusted valve clearance.	Adjust.
	Excess carbon in combustion chamber.	Remove head and get rid of carbon.
	Damaged valve spring (back fire, after fire).	Replace it with a new one.
EXCESSIVE OIL CONSUMPTION		
Oil leakage	Loose oil drain plug.	Tighten it.
	Loose or damaged oil pan gasket.	Renew gasket or tighten it.
	Loose or damaged chain cover gasket.	Renew gasket or tighten it.
	Defective oil seal in front and rear of crankshaft.	Renew oil seal.
	Loose or damaged locker cover gasket.	Renew gasket or tighten it (but not too much).
	Improper tightening of oil filter.	Renew gasket and tighten it with the proper torque.
	Loose or damaged oil pressure switch.	Renew oil pressure switch or tighten it.

Condition	Probable cause	Corrective action
Excessive oil consumption	Cylinder and piston wear.	Overhaul cylinder and renew piston.
	Improper location of piston ring gap or reversely assembled piston ring.	Remount piston rings.
	Damage piston rings.	Renew rings.
		Repair or renew piston and cylinder.
	Worn piston ring groove and ring.	Renew piston and piston ring.
	Fatigue of valve oil seal lip.	Replace seal lip with a new one.
	Worn valve stem.	Renew valve or guide.
Others	Inadequate quality of engine oil.	Use the designated oil.
	Engine overheat.	Previously mentioned.
POOR FUEL ECONOMY		
See the explanation of the power decrease		
Others	Exceeding idling revolution.	Adjust it to the designated rpm.
	Defective acceleration recovery.	Adjust it.
	Fuel leakage.	Repair or tighten the connection of fuel pipes.
TROUBLE IN OTHER FUNCTIONS		
Decreased oil pressure	Inadequate oil quality.	Use the designated oil.
	Overheat.	Previously mentioned.
	Defective function of oil pump regulator valve.	Disassemble oil pump and repair or renew it.
	Functional deterioration of oil pump.	Repair or replace it with a new one.
	Blocked oil filter.	Renew it.
	Increased clearance in various sliding parts.	Disassemble and replace the worn parts with new ones.
	Blocked oil strainer.	Clean it.
	Troubles in oil gauge pressure switch.	Replace it with a new one.
Excessive wear on the sliding parts	Oil pressure decreases.	Previously mentioned.
	Defective quality or contamination of oil.	Exchange the oil with proper one and change element.
	Defective air cleaner.	Change element.
	Overheat or overcool.	Previously mentioned.
	Improper fuel mixture.	Check the fuel system.
Scuffing of sliding parts	Decrease of oil pressure.	Previously mentioned.
	Insufficient clearances.	Readjust to the designated clearances.
	Overheat.	Previously mentioned.
	Improper fuel mixture.	Check the fuel system.